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Subsurface Oxygen Sensor Specifications

| | |
|------------------------------------|---|
| Part #: | XT253-XX, (were XX = length in feet) |
| Sensor Type: | Electrochemical cell |
| Sensor Life: | ≈ 7 years |
| Temperature Compensation: | Internal thermistor |
| Pressure Compensation: | None (see pressure compensation notes) |
| Accuracy (full scale): | ≈ 1% for oxygen depleting (calibration at 20.9%) |
| Storage Temperature: | 0 - 70° C |
| Storage and Operating Orientation: | Vertical |
| Operating Temperature: | 0 - 70° C |
| Output Signal: | mV or 4-20mA |
| Maintenance Required: | None |
| Calibration Requirements: | Calibrate in air before installation (see long term stability fig. 1) |
| Installation Methods: | 2" or larger monitoring well or directly buried in soil |
| Response Time: | 12 Sec. (5 min. for temperature compensation) |

Influence of Various Gases

| Influence Level | Gas Type |
|-----------------|---|
| Unaffected | CO ₂ , CO, H ₂ S, SO ₂ , H ₂ , CL ₂ , CFC's, CH ₄ , N ₂ , etc. |
| Affected | NH ₃ (ammonia), Ozone |

Pressure Influence

The oxygen sensor is responsive to partial pressure of oxygen molecules, which enter the sensor through a Teflon membrane. The effects from a change (from calibration point) in atmospheric pressure can be corrected by recalibration of sensor. It is recommended to calibrate the sensor on site to compensate for pressure-altitude equivalents (e.g. -531 ft. = 1033mB, sea level = 1013mB, 5974 ft. = 813mB). The following equation represents the effect of pressure influence on the sensor.

Subsurface Oxygen Sensor Specifications Cont.

$$V_o = V_{os} \times (P/1013) \quad \text{were...} \quad P = \text{pressure (mB)}$$

$$V_{os} = \text{voltage at 1013 mB}$$

$$V_o = \text{voltage output (mV)}$$

$$V_{os} = 44.3\text{mv @ } 1013 = 20.9\% \text{ O}_2, \quad C_f = .5, \quad \approx \% \text{O}_2 = C_f \times (V_o - 2.5)$$

$$29.3 \text{ in. Hg. (sea level - storm conditions)} \quad 20.5\% \text{ O}_2 = .5 \times ((44.3 \times 992/1013) - O_v)$$

$$29.9 \text{ in. Hg. (sea level - calm conditions)} \quad 20.9\% \text{ O}_2 = .5 \times ((44.3 \times 1013/1013) - O_v)$$

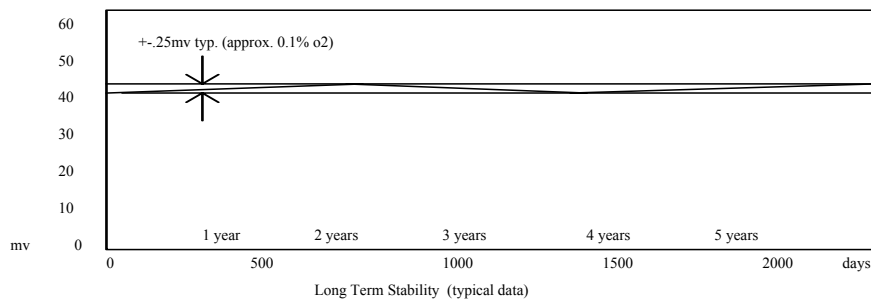
$$30.5 \text{ in. Hg. (sea level - storm conditions)} \quad 21.3\% \text{ O}_2 = .5 \times ((44.3 \times 1033/1013) - O_v)$$

$$\text{were...} \quad O_v = \text{offset voltage @ } 0\% \text{ O}_2 = \approx 2.5\text{mV}$$

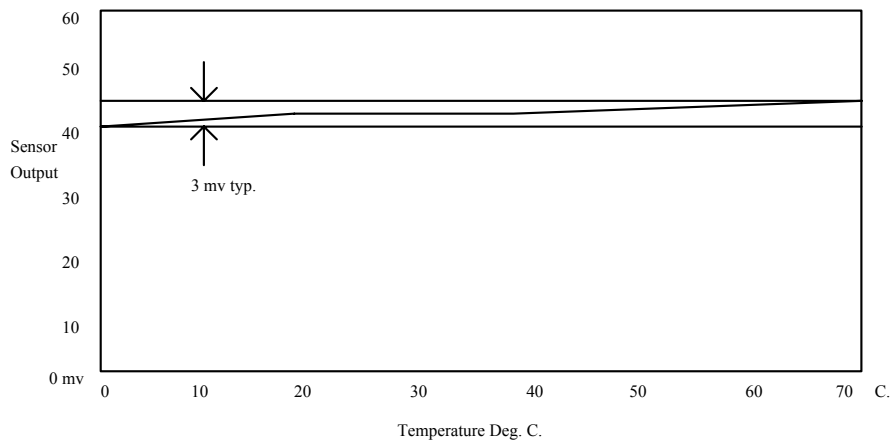
$$C_f = \text{calibration factor} = 20.9/(V_o \text{ @ } 20.9\% \text{ O}_2 - O_v)$$

As shown above, considerable changes in barometric pressure is not great enough to produce serious degradation in sensor performance for long term remediation monitoring applications. Studies indicate that for in-situ O₂ monitoring possible diurnal change caused by various impeding factors affect subsurface O₂ concentration levels (see oxygen sensor applications literature).

Long Term Stability (fig. 1)



Temperature Compensation (fig. 2)



Subsurface Oxygen Sensor Specifications Cont.

Sensitivity Characteristics (fig. 3)

